

WHAT IS CLAIMED IS:

1. A tape guide for use with a data storage tape system, the tape guide comprising:
a bearing portion; and
a tape interface portion extending from the bearing portion, the tape interface portion configured to support a data storage tape near a read/write head;
wherein upon longitudinal movement of the data storage tape across the tape interface portion, the tape guide limits a spectral content of data storage tape lateral movement measured at the read/write head to less than 0.1 μm at lateral movement frequencies between 50 and 500 cycles/meter.
2. The tape guide of claim 1, wherein the tape interface portion rotates with respect to the bearing portion.
3. The tape guide claim 2, wherein the radial runout of the tape guide is less than 0.5 mil.
4. The tape guide of claim 1, wherein the tape interface portion includes an outer surface configured and positioned to have intimate contact with the data storage tape as the data storage tape passes over the tape interface portion.
5. The tape guide of claim 1, wherein the outer surface includes a plurality of substantially concentric grooves.
6. The tape guide of claim 5, wherein the plurality of substantially concentric grooves are configured to remove air from between the data storage tape and the outer surface of the tape interface portion.
7. The tape guide of claim 1, wherein the tape interface portion is characterized by the absence of flanges.
8. A data storage tape system comprising:

a read/write head configured to read from or write to a data storage tape;
a first tape guide spaced from the read/write head; and
a second tape guide spaced from the read/write head opposite the first tape guide, the first and second tape guides configured to support the data storage tape near the read/write head;
wherein upon longitudinal movement of the data storage tape across the first and second tape guides, the first and second tape guides limit a spectral content of the data storage tape lateral movement measured at the read/write head to less than 0.1 μm at lateral movement frequencies between 50 and 500 cycles/meter.

9. The data storage tape system of claim 8, wherein at least one of the first and second tape guides is a rotating guide and the radial runout of each of the rotating guides is less than 0.5 mil.

10. The data storage tape system of claim 8, wherein at least one of the first and second tape guides is configured and positioned to have intimate contact with the data storage tape as the data storage tape passes over the respective tape guide.

11. The data storage tape system of claim 8, wherein both of the first and second tape guides are configured and positioned to have intimate contact with the data storage tape as the data storage tape passes over the respective tape guide.

12. The data storage tape system of claim 8, wherein at least one of the first and second tape guides defines an outer surface that includes a plurality of substantially concentric grooves configured to remove air from between the data storage tape and the outer surface of the respective tape guide.

13. The data storage tape system of claim 8, wherein a center of the first tape guide and the second tape guide are each spaced from a center of the read/write head less than twice the width of the length of data storage tape.

14. The data storage tape system of claim 8, wherein the first tape guide interacts with the length of data storage tape to define a degree of wrap greater than 30°.
15. That data storage tape system of claim 14, wherein the second tape guide interacts with the length of data storage tape to define a degree of wrap greater than 30°.
16. The data storage tape system of claim 8, wherein the first and second tape guides are maintained in a data storage tape cartridge.
17. The data storage tape system of claim 8, wherein the first and second tape guides are maintained in a data storage tape drive.
18. The data storage tape system of claim 8, wherein the first and second tape guides decrease the magnitude of the longitudinal stress waves in the data storage tape traveling between the first and second tape guides.
19. The data storage tape system of claim 8, further comprising:
 - a first collateral tape guide spaced from the first tape guide opposite the read/write head; and
 - a second collateral tape guide spaced from the second tape guide opposite the read/write head;wherein the first and second collateral tape guides limit the amplitude of tape transverse movement across the first and second collateral tape guides, respectively.
20. A method of controlling error in reading from or writing to a data storage tape, the method comprising:
 - providing a first tape guide spaced from a read/write head and a second tape guide spaced from the read/write head opposite the first tape guide;
 - supporting the data storage tape between the first and a second tape guides, as the data storage tape passes the read/write head;

longitudinally moving the data storage tape across the tape guides and the read/write head; and
limiting a spectral content of the data storage tape lateral movement measured at the read/write head to less than $0.1\text{ }\mu\text{m}$ at lateral movement frequencies between 50 and 500 cycles/meter.